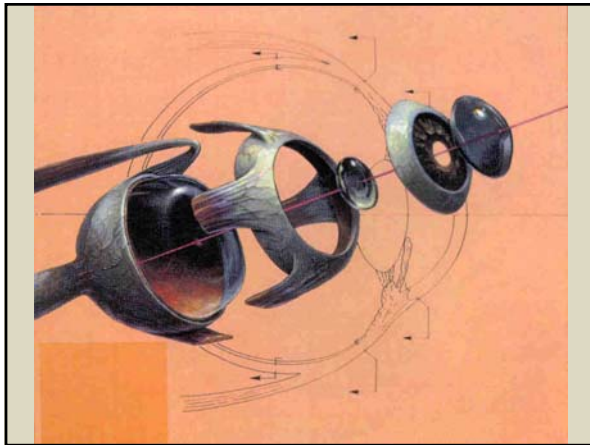


Are you ready for the Resolution
Evolution?

Richard Erdey, MD
Erdey Searcy Eye Group

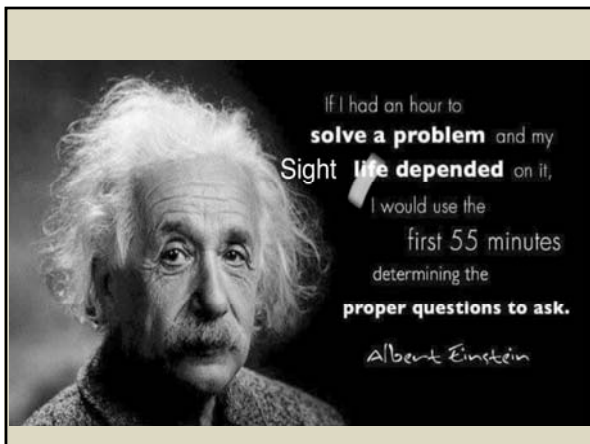
Optimizing corneal surgical
outcomes
for the long haul!

Richard Erdey, MD
Erdey Searcy Eye Group



Methods:
Change corneal shape
Replace when diseased

- Slice
- Dice
- Ablate
- Heat
- Stiffen
- Implants/Inlays
- Transplant



Questions:

- Stability – LONG TERM?
- How good are the optics?
- Predictable?
- Adjustable?
- Reversible?
- Safe?

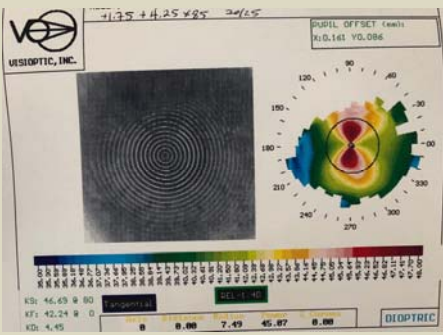
Change Corneal Shape: Methods

- Slice
- Dice
- Ablate
- Heat
- Stiffen
- Implants/Inlays
- Transplant
- RK /AK (1980)/Microkeratome/fempto
- Smile (2016)
- **PRK/LASIK** (1995)
- Conductive Keratoplasty (2004)
Holmium Laser (2000)
- Collagen Cross Linking (2016)
- **Intacs**, (1998) Kamra (2015)/Raindrop (2016)
- Penetrating keratoplasty (PK) (1905)
DSEK (2005)/DMEK (2011)
Deep Anterior Lamellar Keratoplasty (DALK) (1960)

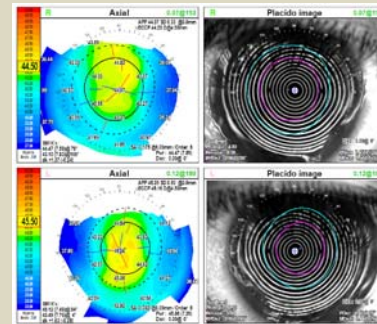
#1 How long will this corneal change induced by surgery last?

- Long – term stability

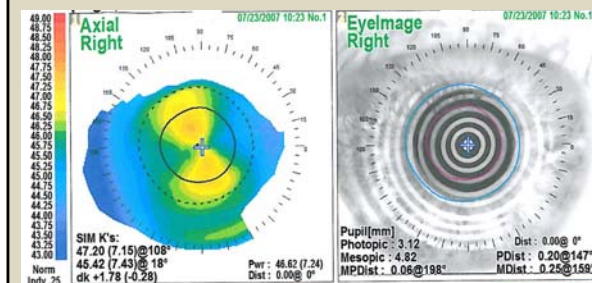
Hyperopic/Astigmatism LASIK



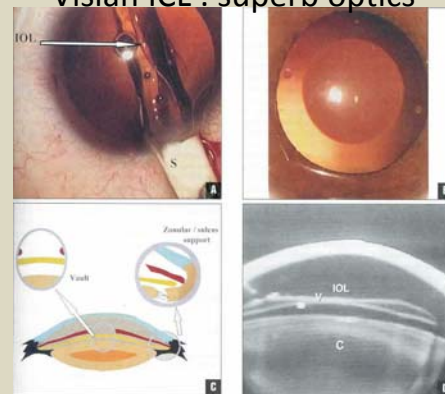
2018 (17 yrs later) UCVA OD 20/20, OS 20/20



47 yo -12.25 + 2.5 x 123 20/20



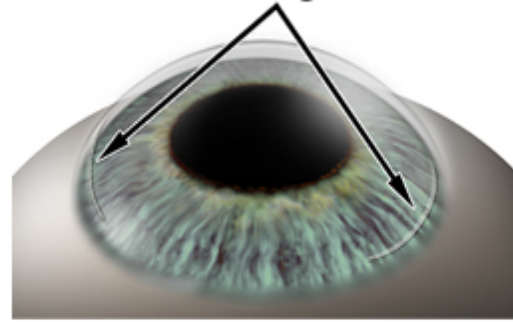
Visian ICL : superb optics



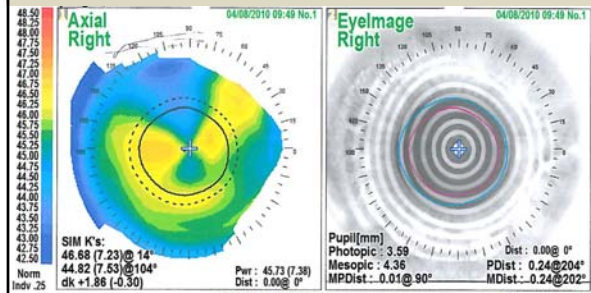
APPROVED - US FDA ICL MYOPIA - December 2005

- -3 to -15D "Correction of Myopia"
- -16 to -20.0 D "Reduction of Myopia" (expect undercorrection)
- 21 to 45 yrs age with stable myopia

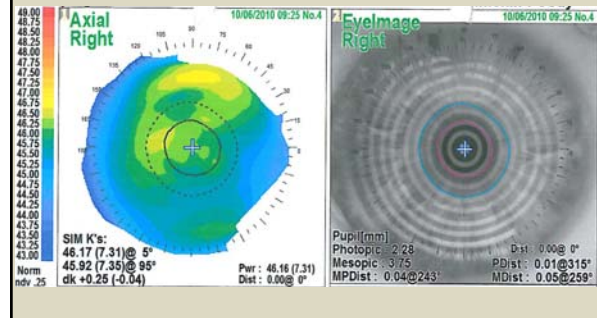
Limbal Relaxing Incisions



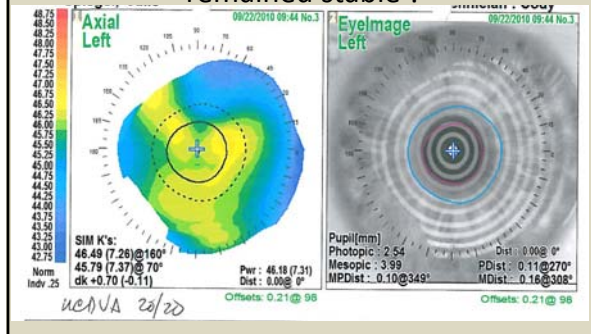
ICL / LRI OD 50 yrs, 2.5yrs post-op
UCVA 20/40
-1.0+2.0x15 20/30



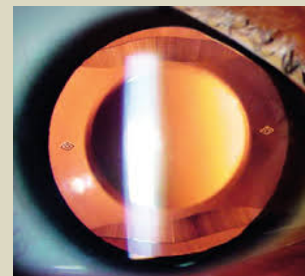
Recompress incision 10-0 nylon interrupted suture
UCVA 20/20



But the other eye... OS:
2.5 yrs after ICL/ LRI OS
remained stable !



TORIC ICL: US FDA APPROVED!

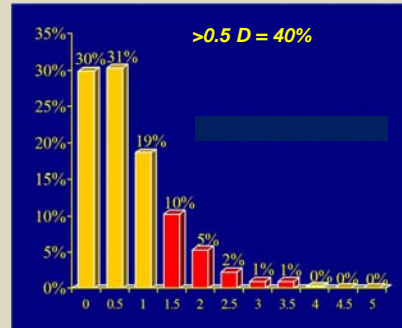


APPROVED - US FDA ICL MYOPIA - September 2018

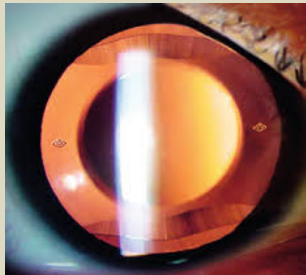
• 1 to 4 D cylinder

- -3 to -15D "Correction of Myopia"
- -16 to -20.0 D "Reduction of Myopia" (expect undercorrection)
- 21 to 45 yrs age with stable myopia

Astigmatism: Prevalence



TORIC ICL: US FDA APPROVED!
47yo: First in OHIO December 2018!

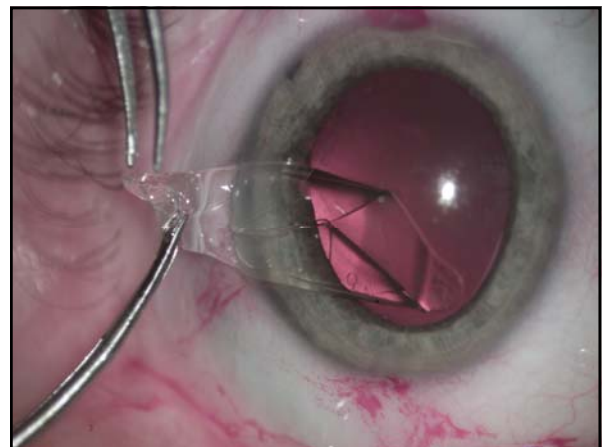


TORIC ICL: US FDA APPROVED!
47yo: First in OHIO December 2018!

- OD -11.25+4.25x122
- Staar Visian TMICL 12.6 -11.0/4.0x109
- OS -11.75+4.0x61
- Staar Visian TMICL 12.6 -12.0/4.0 x 066

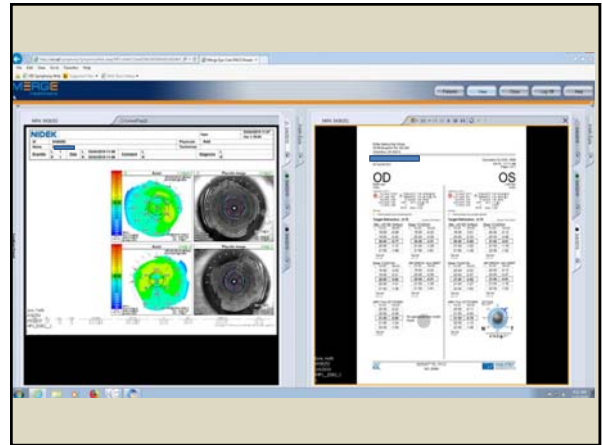
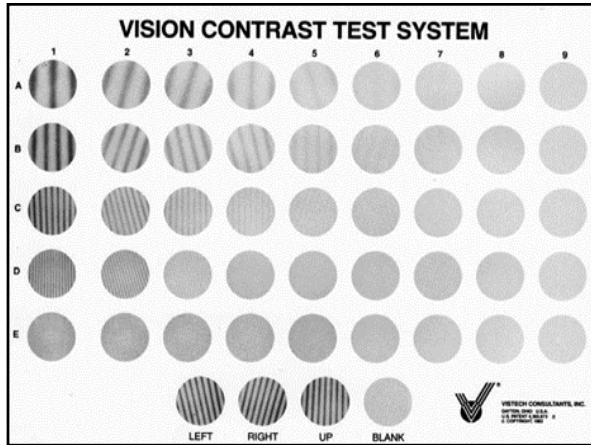
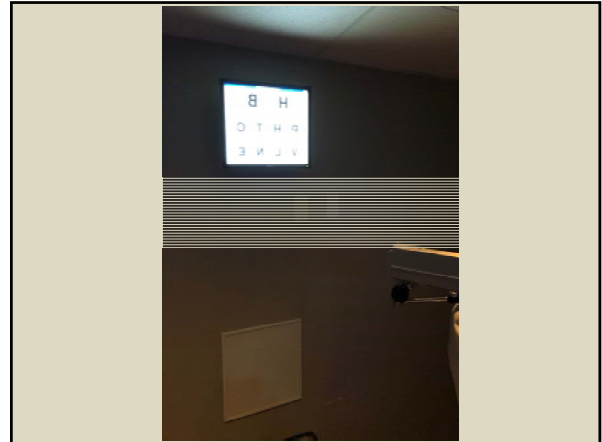
TORIC ICL: US FDA APPROVED!
47yo: First in OHIO December 2018!

- **Uncorrected Distance Visual Acuity**
- **OD: 20/20 OS: 20/20**

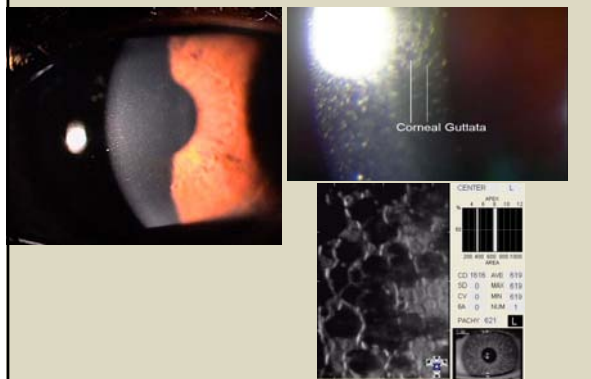


#2

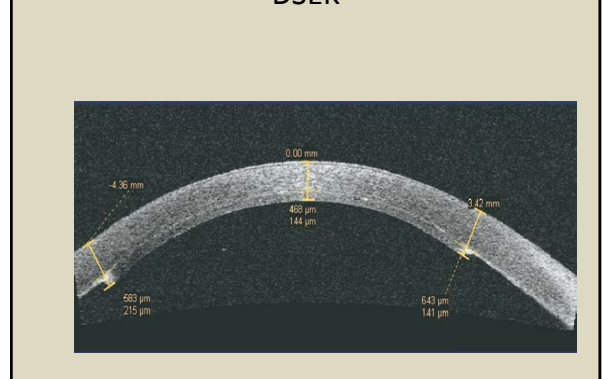
- What optical result will this provide?



Fuchs' Corneal Dystrophy



DSEK



Descemet's Membrane Endothelial Keratoplasty (DMEK)



DMEK:

Visual outcome @ 6mos (n = 221)

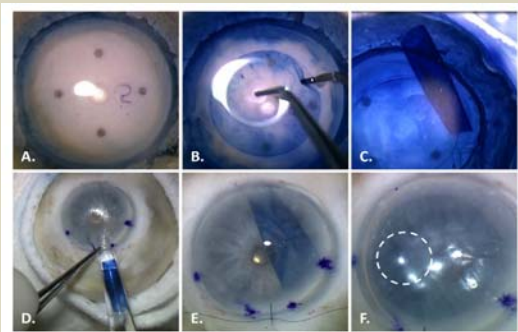
BSCVA:

- $\geq 20/40$ 98%
- $\geq 20/25$ 79%
- $\geq 20/20$ 46%
- $\geq 20/18$ 14%

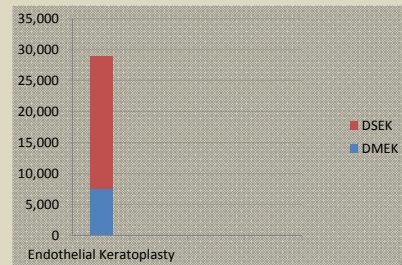
Negligible refractive shift

Contact Lens & Anterior Eye - Melles
Volume 36, Issue 1, Pages 13-21, February 2013

DMEK: Descemet's donor scroll insertion

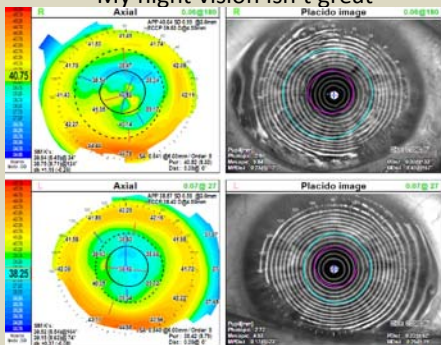


DSEK vs DMEK: USA – 2017
DMEK: 26% of Endothelial Keratoplasty



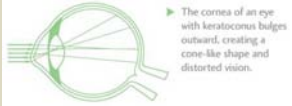
65yo s/p LASIK (-7.0 OU) 10 yrs ago and see great during the day without glasses but...

“My night vision isn't great”

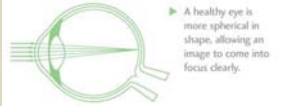


Keratoconus Goal of Surgery:

- Make eye refractable with glasses.
- Clear visual axis of scarring, if present.
- Stop progression

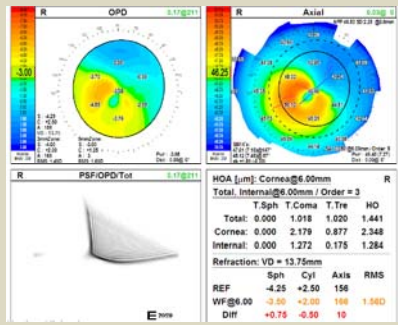


▶ The cornea of an eye with keratoconus bulges outward, creating a cone-like shape and distorted vision.



▶ A healthy eye is more spherical in shape, allowing an image to come into focus clearly.

34yo male wears glasses
OD: -2.5+3.0x160 20/20



OPD 0.17@0.11 Axial 0.00@0.11

PSF/OPD/Tot 0.17@0.11

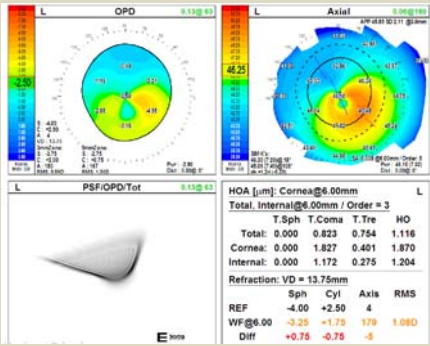
HOA [μm]: Cornea@6.00mm
Total, Internal@6.00mm / Order = 3

T.Sph	T.Coma	T.Tre	HO
Total: 0.000	1.018	1.020	1.441
Cornea: 0.000	2.179	0.877	2.348
Internal: 0.000	1.272	0.175	1.284

Refraction: VD = 13.75mm

REF	Sph	Cyl	Axis	RMS
-4.25	+2.50	156		
WF@6.00	-3.50	+2.00	166	1.060
Diff	+0.75	-0.50	10	

34yo male wears glasses
OS: -3.0+2.5 x 007 20/20



OPD 0.13@0.13 Axial 0.00@0.10

PSF/OPD/Tot 0.13@0.13

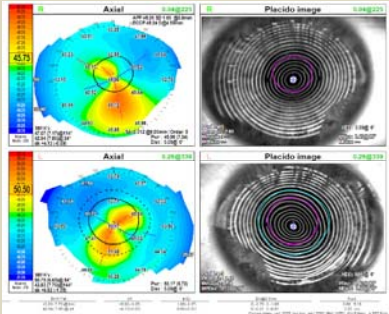
HOA [μm]: Cornea@6.00mm
Total, Internal@6.00mm / Order = 3

T.Sph	T.Coma	T.Tre	HO
Total: 0.000	0.823	0.754	1.116
Cornea: 0.000	1.827	0.491	1.870
Internal: 0.000	1.172	0.275	1.204

Refraction: VD = 13.75mm

REF	Sph	Cyl	Axis	RMS
-4.00	+2.50	4		
WF@6.00	-3.25	+1.75	179	1.080
Diff	+0.75	-0.75	-8	


LASIK OU 2008 -3.0 "vision OK 4 yrs" ectasia
3 mos after crosslinking OS
OD: -2.50+2.0x165 20/20
OS: Unable: 20/150
"I still cannot see out of my left eye"



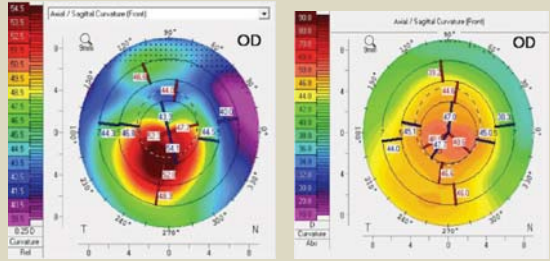
OS Axial 0.00@0.11 Placido image 0.00@0.11

OS Axial 0.00@0.11 Placido image 0.00@0.11

Crosslinking



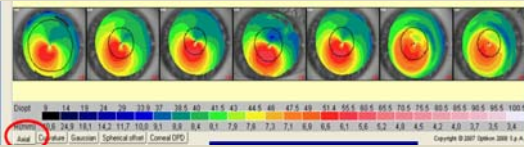
DALK: Future? Topoguided PRK/x-link



OD Axial / Sagittal Curvature (Front) 0.00@0.11

OD Axial / Sagittal Curvature (Front) 0.00@0.11

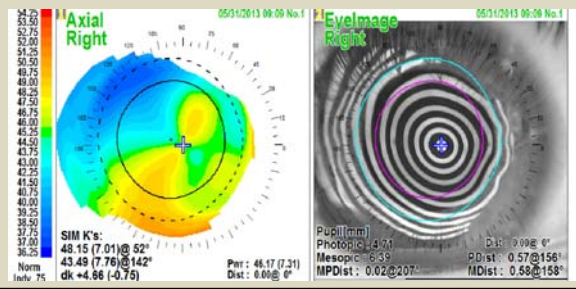
Early results: stops progression
3-5 yrs (and beyond?) ave K's 1 D flatter
MOVING TARGET?



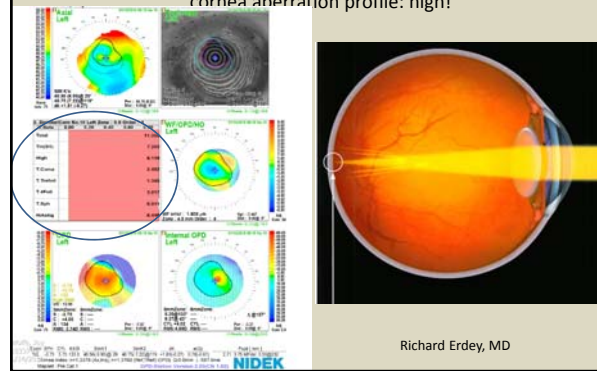
Penetrating Keratoplasty (PK)



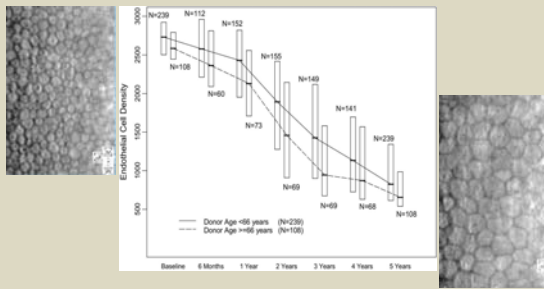
20 y/o PK 7.5mm – keratoconus
Suture out 2 year after surg



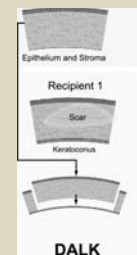
Case 1: Cornea Scar 1.5 yr post-op PK
8.25 mm dia., suture out -3.5+2.25x39 20/25
cornea aberration profile: high!

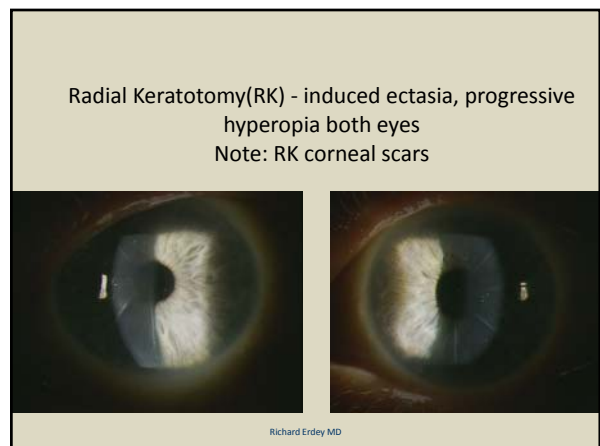
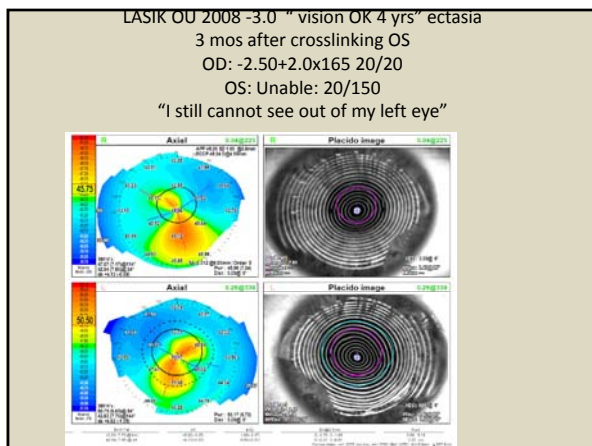
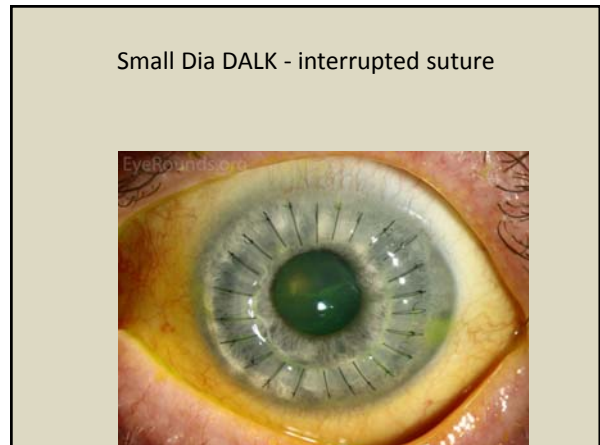
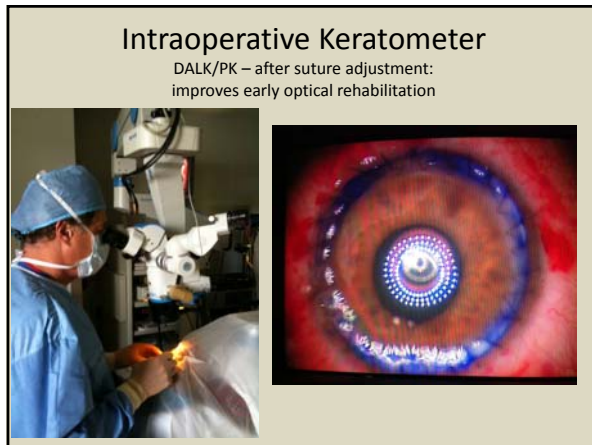


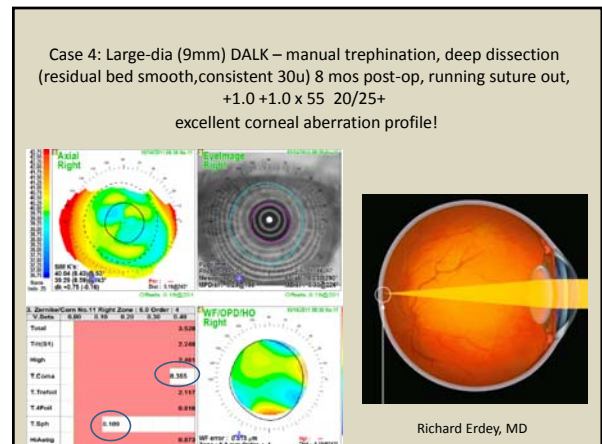
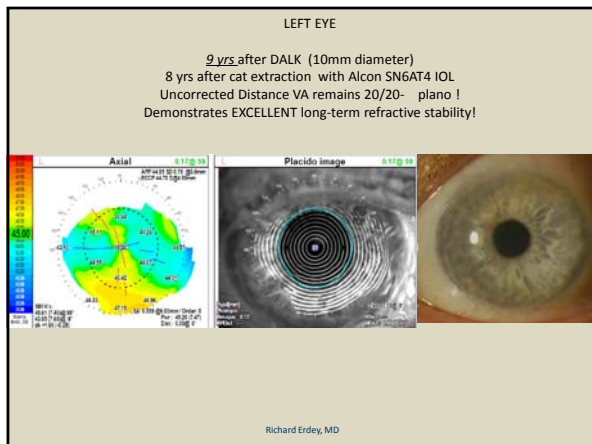
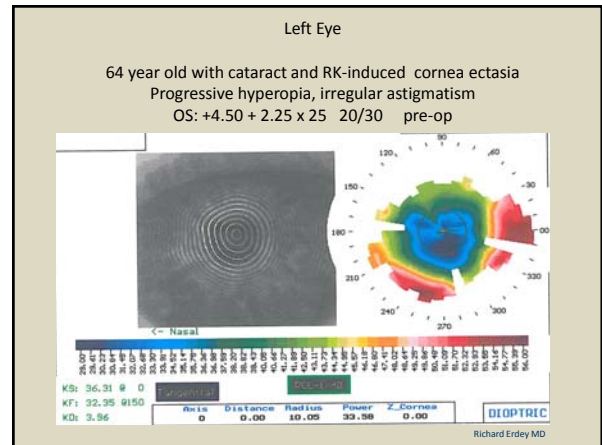
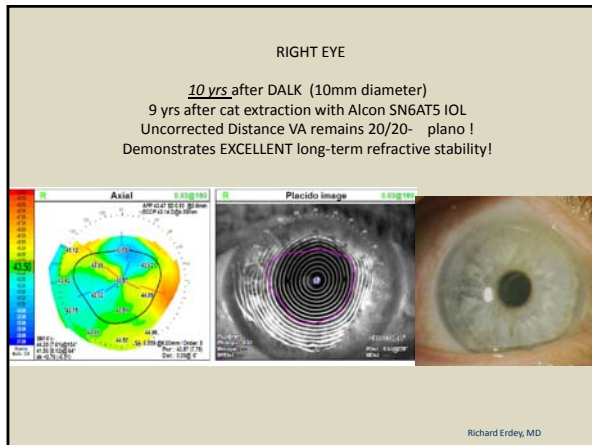
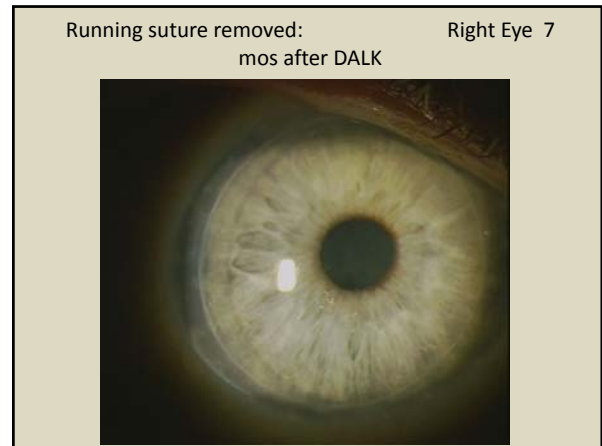
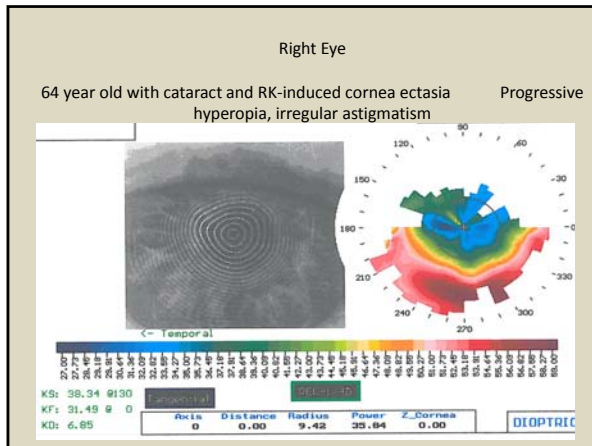
Cornea Donor Study
Ophthalmology 2008 - *Cornea Donor Study Investigator Group*

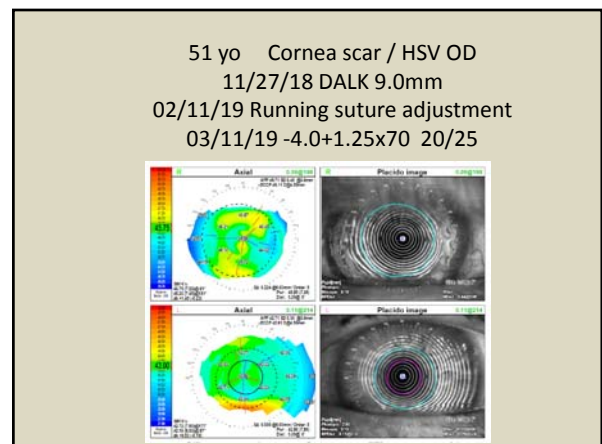
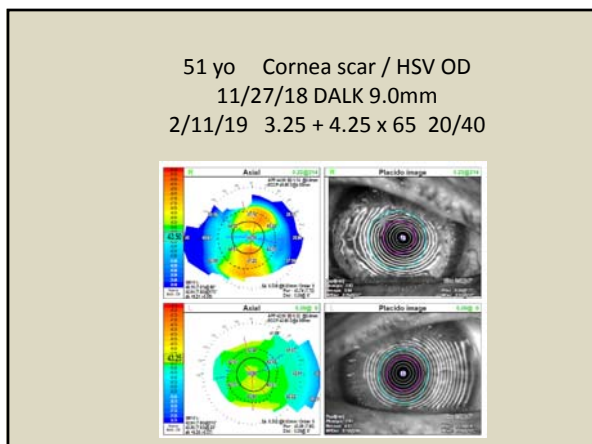
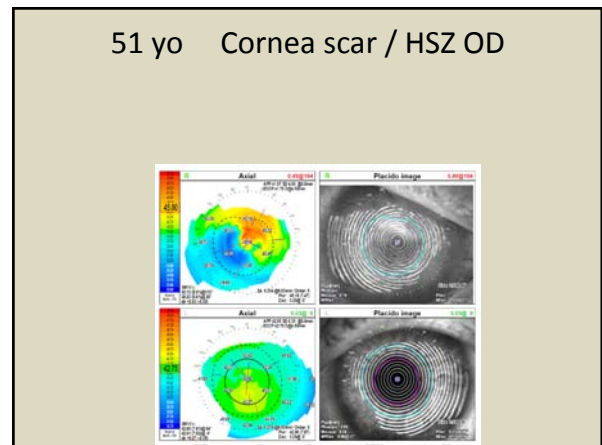
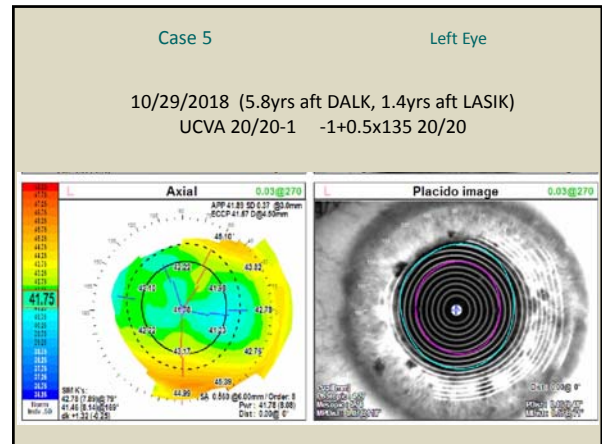
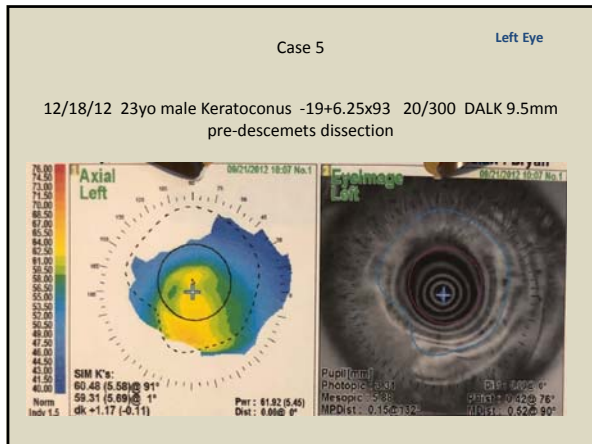


Deep Anterior Lamellar Keratoplasty (DALK) Challenge:





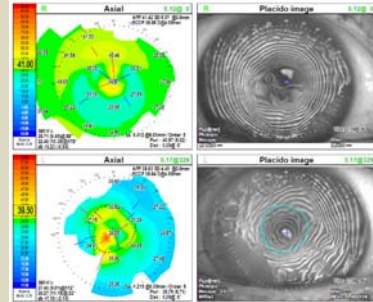




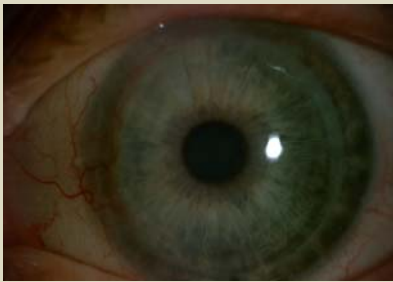
57 yo FM Bilateral Central Thinning and Cornea scars /HSV
BSCVA 20/400 EACH EYE!



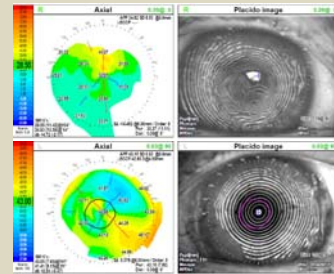
57 yo FM Bilateral Central – Disabled!



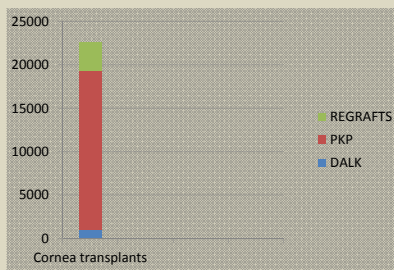
57 yo FM Bilateral Central Thinning and Cornea scars /HSV
8/2018 DALK 9.0mm OS
3/2019 OS UCVA 20/50



57 yo FM Bilateral Central
8/2018 DALK 9.0mm
3/2019 OS UCVA 20/50



DALK vs PK - 2017
Are we conserving recipient endothelial cells during surgery and what is long term graft survival?



Summary

- Its all about superior optics, visual clarity, long term stability